

Darnall (C. F.)

Rupture of the Spleen from a Phlebolite,
With Consequent Death.---Uterus
Unicornis.

BY CHARLES F. DARNALL, M. D.,
OF WALNUT, IOWA.

u. f. a.

Read before the Iowa State Medical Society, at Cedar
Rapids, May 20, 1885.

*Reprinted from the Journal of the American Medical
Association, August 22, 1885.*



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RUPTURE OF THE SPLEEN FROM A PHLEBOLITE,
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The subject of pathology being especially important to the physician, I take pleasure in contributing a mite to our accumulation of knowledge upon that topic; and it is done with the confession that wherever the writer has been wrong in his deductions and conclusions, it is for the reason that he has followed a rather obscure path, and not from the fact that the approval of others has been the incentive.

My subject, as indicated above, is the result of a *post-mortem* examination, and the conditions therein existing were so new, that they have been investigated and formulated with the belief that the presentation will excite at least a momentary interest.

I was called on the morning of January 30, 1885, to see a German woman, æt. 36, VI-para, who had been attacked at four o'clock that morning with sudden pain in the bowels, followed by shock and syncope. The pulse was 120, temperature 96° F., and respiration 30, with prolonged expiratory efforts and much general suffering. There was no history of malaria, typhus or typhoid fevers, or any of the dyscrasiæ, nor of rheumatism or disease of the muscles or joints. She had never experienced any pulmonary or hepatic trouble; her nervous system had always been supposed to be in good condition, her menstrual periods easy and regular, without any ovarian or uterine difficulty. She had always occasional attacks of indigestion, unaccompanied with

much pain, and her bowels were usually in a constipated condition. Her principal cause of sickness was in her kidneys, and her physician had treated her for "Bright's disease" a few months before her death. She was confined to her bed for several weeks with the supposed albuminuria, and only partially recovered. From her subsequent symptoms it is to be conjectured that she was afflicted with acute idiopathic cystitis. For a few weeks previous to the time when she was first seen, her physician, in treating her for her constipation, exhibited jalap, rhubarb, and other drastics, meeting with no success, as their effect was unable to correct her condition.

When she was first seen by the writer there was pain on pressure over the spleen and also in the right iliac region, and the omentum gave on palpation a peculiar brawny sensation, with no tympanitis or peritonitis. No absolute diagnosis being made other than that of a possible perforation of the bowel, an enema was ordered, with alcohol, quinine, and opium, hot poultices to the abdomen and dry heat to the extremities. Reaction did not follow, and death ensued on the morning of Feb. 2, three days afterwards.

Twelve hours later a *post-mortem* examination was held. The intestines were found empty, congested, and distended with gas. The omentum was injected, dry, and œdematous, with little serum or blood being present in the peritoneal cavity. The first thing that came to our notice was the half-filled bladder, the whole tissue of which seemed injected and hyperæmic. The uterus was found prolapsed, and the right ovary as large as a hen's egg, while the fimbriated extremity of the Fallopian tube was of a black, gangrenous condition, enlarged and infiltrated. The entire broad ligament was congested up to its attachment to the uterus. The ovary was opened, and discovered to be in a state of cystic degeneration, filled with clear albuminous liquid. Search was made for the left ovary, but it was entirely missing,

as was also the round ligament, ovarian ligament, and usual blood-vessels, forming the anomaly known as *uterus unicornus*. The unilateral development characteristic of this rare condition of the uterus so far as the fundus pointing toward that side in which the ovary was present, was obliterated, being found in its highest state of perfection in the virgin; and as this woman had given birth to a child a few months before, the body of the uterus seemed not to have yet returned to that period of involution when this feature would be especially prominent.

The broad ligament was present, and between its folds was found the organ of Rosenmüller. As menstruation had taken place three weeks before death, the remaining ovary was further examined. A portion of it was found to be of normal tissue, full of Graafian vesicles, and *corpora lutea* in various stages of development and disappearance. The latter were of different sizes, lined with the duplicature of yellow granules of fat, and in the centre of one or two were blood clots. Surrounding them the tissue was of the natural type—not congested—and extended over upon the sides of the main cyst, showing it had sprung from one of them, and was of recent growth. Externally the walls of this cyst were of a white fibrous nature, internally of the peculiar bluish color common to ovarian tumors. The degeneration being multilocular, several very small cysts were in the parenchyma of the ovary, adjacent to the largest cyst, all filled with brownish or straw-colored liquids.

Proceeding in the search for the cause of death, the stomach was found to be in a rather congested state, the liver dark colored with spots of atrophy or contraction, and the kidneys injected, enlarged, and flabby. The spleen was atrophied, and upon the external surface near the superior edge we discovered a rent or laceration, large enough to admit the finger, from which exuded a small quantity of clotted blood. The solution of continuity was transverse to

the length of the spleen, about two centimetres long, and in depth nearly three centimetres. Upon the internal surface was found what appeared to be a spot of fatty degeneration, as large as a silver dollar, covered by a tough yellow-covered serous membrane, which being opened gave vent to a discharge of lymph or detritus. The bottom of the laceration was contiguous to this diseased spot, there being only about a centimetre of tissue intervening. In making this cursory examination of the abdominal viscera, a glimpse was caught of a foreign substance laying among the folds of intestine, and our next discovery was this same body in Douglas's fossa, whence it had gravitated during our manipulations. This was of a hard nature like a renal calculus, nearly the size of a horse bean, curved on the flat, rough, no facets, and in weight about one gramme.

Naturally we linked together this concretion and the rupture in the spleen, but doubt being expressed that a calculus could come from a ductless gland, careful search was made of the intestines, gall-cyst, kidneys, and ureters, in the hope of finding an opening whence it could have escaped into the abdomen; but with no success. The rupture in the spleen was of such a nature as showed the spontaneous expulsion of the body, and upon a second search being made with the same result, the conclusion was forced upon us that this unpretending organ in the human economy was the *habitat* of the nodule, and that its presence, or rather its liberation, was the cause of rupture and death.

I have been unable to find on record such a thing as a *splenic* calculus, but our standard medical lexicographer (Dunglison) says in his definition of the word that a calculus may form in the substance of a body or organ, as the result of nutritive irritation, and be expelled spontaneously. Prof. Fitz says, in the new "American System of Medicine," that path-

¹Vol. I, 1885, p. 89.

ological deposits, in the form of calculi, occur in those organs which convey in canals their peculiar secretory fluids, and that these are formed of the predominating inorganic matter in them; as, for instance, a renal calculus in the pelvis of the kidney, which on analysis will be found to be composed of the urates of sodium, potassium, calcium, magnesium, or ammonium, or their phosphates or oxalates. The spleen having no duct, the question of this being a calculus is excluded and disposed of.

The next thought is of tuberculous origin, but we may differentiate that idea. There was no evidence of a tuberculous deposit in the mesentery, liver, or intestines, and where the abdominal cavity is invaded it is more apt to become general, and does not attack a small portion of one organ, leaving the balance of the viscera alone. Besides, the deposits are of the miliary type at first, small minute bodies, and in consistence are not hard like the one under consideration, but of a soft waxy nature, easily cut, and showing the presence of earthy deposit. They are never of such hardness as to cut out of a tissue spontaneously, making a free and clean incision. There *can* be tuberculous calcific degeneration, but the agglomeration of single tubercles and consequent calcification cause a mush or cheese-like substance to form, and never hard or stony, which excludes this thought, and we now turn to the next theory, which probably is more correct.

The question of concretion presents itself as a plausible one, when we understand that cretaceous degeneration may take place in any portion of the body. Calcification is a deposit of salts, previously held in solution in the blood, under abnormal circumstances, in and upon organic matter, as the result for instance of an inflammation. This inexplicable fact is well known, and Stricker says, in the "International Encyclopædia of Surgery,"¹ that "tissues have the

¹Vol. I, 1881, p. 62.

property of depositing lime-salts. . . . As cartilage is converted into bone, it must deposit lime-salts in its basis-substance. But cartilage calcifies sometimes (as for example under the influence of slight inflammatory stimuli) without being converted into bone. Of pathological calcifications of other tissues, too little is known beside the mere fact that they do occur, to warrant my considering them here." Fitz says further that concretions occur in the tissues of organs, and are collections of inorganic salts, chiefly the carbonate and phosphate of calcium, hence deposited through the agency of the blood. It is not necessary that these calcifications take place in the solid portion of an organ, for veins are often found with a concretion, or *phlebolite*, and this is the development of my investigation. That this is a concretion an analysis showed it to be carbonate of lime, while the laceration in the spleen terminated in the splenic vein, enlarged and dilated, into which the vein stone I present seemed to fit quite naturally.

The absolute cause of this strange formation is of course speculative, but so far as a general review of literature has to do with forming an opinion, the preponderance is in favor of hemorrhagic infarction, according to Cohnheim,¹ or coagulation-necrosis, as it is termed by Ziegler.²

An embolus being arrested in a small artery, inducing extravasation and a secondary thrombus in the splenic vein in consequence, or a primary thrombus arising from a similar source in the vein, underwent transformation, interfering with the necessary blood-supply of the surrounding area, and caused upon the surface of the spleen what Ziegler calls the "opaque yellowish-white conical patch." Guillebeau³ endorses this opinion, saying that splenic infarcts are hemorrhagic, quickly becoming decolorized and degenerated. Green⁴ says that infarcts are usually

¹Ziegler's Path. Anat., Wood's Library, July 18, 1883, Art. 36.

²Ibid., Art. 36. ³Ibid.

⁴Pathological Anatomy, Phila., 1881, p. 192.

found in the spleen, wedge shaped, with the apex of the cone toward the centre of the organ, rapidly undergoing softening and disintegration, by regurgitation from the veins into the capillaries

The theory of Rokitsansky¹ regarding phlebolites is that they are caused by a retarded flow in the veins, coagulation and incrustation following, and that within the concretion is an irregular brownish fissure,—the clot, which is found within the one under consideration. He writes: “We not unfrequently find the sheath of the spleen indurated and cartilaginous, or ossified, and at the same time ossification of the arterial ramifications and free calcareous concretions (Phlebolithes) in the veins of the organs.” In *Medizinische Encephalopathie* he says that in atrophy of the spleen as a result of perverted nutrition small concretions are found in the walls of veins, which are free and chalky. They show no symptoms and consequently are not amenable to treatment. Ziegler² says of petrification that the process is derived from the salts in the blood, not simply precipitated and retained, but formed as a solid compound. He mentions that large infarcts of the spleen are sometimes imperfectly reabsorbed, so that the cicatrix incloses a necrotic caseous patch.

Pontick attributes³ the formation of these bodies to thrombi in the veins, but says it is an hypothesis. Delafield and Proddien say that the contents of an abscess of the spleen as the result of embolism may dry, shrink, and become calcified. Orth, in his “Lehrbuch der Pathologischen Anatomie,” states that phlebolites of the spleen are occasionally found, mentioning no case, and speaks of the frequency of degeneration of an infarct from embolism. He says they may become absorbed and contain lime salts. Birch-Hirschfeld⁴ claims that phlebolites are occas-

¹Path. Anatomy, Syd. Ed., Vol. IV, p. 356.

²Ibid., Vol. II, p. 167. ³Op. Cit., Art. 64.

⁴Path. Anat., p. 363. ⁵Lehrbuch der Path. Anat., p. 140.

ionally found in the spleen, resulting in each case from calcification of the thrombus in enlarged veins.

Morgagni¹ records a case in which a phlebolite of the spleen was discovered, in an autopsy, weighing twenty one drams. Bristowe² has found them in the spleen and various organs of the body, and attributes their presence as the result of an adherent blood clot, undergoing degeneration. Callender³ calls them loose calculi, producing no inconvenience. Bichat⁴ thought they occurred in veins wherein there was slow circulation. Hasse⁵ found them in varicose veins, which also is Paget's theory.⁶ Aitken⁷ calls them products of petrification of blood clots in enlarged veins. Quain⁸ says they form from a clot in a vein, and are perfectly harmless. Gross⁹ states that ten, twenty, or thirty phlebolites may be found in enlarged veins of the spleen and pelvic organs. Merbach¹⁰ repeats that they are found in cirroid or varicose veins, usually in the pelvis, composed of blood and inorganic matter. Cruveilhier's¹¹ theory is that they are developed in a clot of blood. Druitt¹² in his surgery shows an illustration of a female who had several phlebolites in irregularly dilated veins under the lower jaw, which were removed with the knife.

The only other case I can find on record of a knowledge of their presence *ante mortem* is reported by Gould,¹³ who found in a female patient a concretion over two inches long, laying in a dilated vein transversely across the tendon of the semitendinosus muscle in the popliteal space, and its formation he attributed to a thrombus. It was not removed. Wyeth¹⁴ says that phlebolites are found in cutaneous

¹Wardell, Reynold's Syst. of Med., Vol. III, p. 471.

²Bristowe, *ibid*, Vol. II, p. 883. ³Holmes' Surg., q. v.

⁴Anat. Gén., par Bérclard. ⁵Vide Holmes, Art. by Callender.

⁶Lecture 29, p. 488. ⁷Aitkin's Practice, Vol. I, p. 127.

⁸Quain, Dict. of Med. ⁹Gross' Surg., Vol. I, p. 817.

¹⁰Medinisch Encyclopädie, Art. Milzkrankheiten.

¹¹Vide Callender, *op. cit.* ¹²Page 320.

¹³Phila. Medical News, Vol. XI.III, No. 9.

¹⁴International Encyclopædia of Surgery, Vol. III, p. 372.

venous tumors, and in opposition to what has been cited, says that the circulation is active. Our various works of surgery mention phlebolites, and the opinions are circumstantially as given above. I can find also that these concretions are found in hæmorrhoids, as well as in the external genital organs.

Nearly sixty cases of rupture of the spleen can be tabulated, so far as my study has gone, and about one-fourth occurred spontaneously after unusual muscular exertion, for instance after vomiting, straining at stool, or a sudden twist of the body. In all these cases the viscus had previously suffered from disease, as malaria, typhus or typhoid fevers, or some malady resulting in softening of its tissue. Traumatic causes make up the other three-fourths, and are usually gunshot wounds, blows, and falls. Of all cases of rupture, none is recorded as being caused by a concretion, and as death in the patient undoubtedly ensued from rupture in consequence of liberation of the phlebolite induced by hard straining at stool, this is placed on record as perhaps the first case of the kind. In a communication from Surgeon-General Billings, librarian of the Army Medical Museum and Library, he says, "I have had our index references to rupture of the spleen examined. There are many cases of rupture of the spleen reported, but I have not found any due to or connected with a phlebolite."

The malformation of the uterus and appendages is another rarity, and want of time forbids a lengthy discussion of the condition. The text books all speak of *uterus unicornis*, but Tait¹ in his book says he has been able to find on record only one case of this singular development. This he credits to Chaus sier as quoted by Busch.

¹Diseases of the Ovaries, N. Y., 1883, p. 36.



